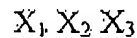


## CLAIMS:

1. An isolated peptide of the formula:



wherein:

$X_1$  and  $X_3$  may be the same or different and each is an amino acid sequence comprising from 0 to 40 naturally or non-naturally occurring amino acid residues;

$X_2$  is any amino acid sequence derived from or homologues to Lol p 1,

and wherein said peptide molecule is capable of interacting with T cells and modifying T cell function when incubated with cells from subjects having a condition characterised by an aberrant, unwanted or otherwise inappropriate immune response to Lol p 1 or a functional derivative, homologue, mutant or analogue of said peptide.

2. An isolated peptide of the formula:



wherein:

$X_1$  and  $X_3$  may be the same or different and each is an amino acid sequence comprising from 0 to 40 naturally or non-naturally occurring amino acid residues;

$X_2$  is any amino acid sequence derived from or homologues to Lol p 5,

and wherein said peptide molecule is capable of interacting with T cells and modifying T cell function when incubated with cells from subjects having a condition characterised by an aberrant, unwanted or otherwise inappropriate immune response to Lol p 5 or a

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functional derivative, homologue, mutant or analogue of said peptide provided that  $X_2$  is not the amino acid sequence 100-119 or 190-209.

3. The peptide according to claim 1 wherein  $X_2$  is an amino acid sequence of from 5 to 100 residues derived from, homologous to or contiguous with amino acids 1-240 inclusive of Lol p 1.

4. The peptide according to claim 3 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 19-47, 73-92, 100-128, 127-146, 154-173 and/or 181-209 inclusive of Lol p 1.

5. The peptide according to claim 4 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 19-38, 28-47, 73-92, 100-119, 109-128, 127-146, 154-173, 181-200 and/or 190-209 inclusive of Lol p 1.

6. The peptide according to claim 5 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 19-38, 109-128, 154-173 and/or 190-209 inclusive of Lol p 1.

7. The peptide according to claim 6 wherein said amino acids are 19-38 inclusive of Lol p 1.

8. The peptide according to claim 6 wherein said amino acids are 109-128 and/or 154-173 inclusive of Lol p 1.

9. A peptide according to claim 6 wherein said amino acids are 190-209 inclusive of Lol p 1.

10. The peptide according to claim 2 wherein  $X_2$  is an amino acid sequence of from 5 to 100 residues derived from, homologous to or contiguous with amino acids 1-276 inclusive of Lol p 5.

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11. The peptide according to claim 2 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 37-83, 118-137, 145-173, 172-191 or 190-245 inclusive of Lol p 5.
12. The peptide according to claim 11 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 37-56, 46-65, 55-74, 64-83, 118-137, 145-164, 154-173, 172-191, 199-218, 208-227, 217-236 and/or 226-245 inclusive of Lol p 5.
13. The peptide according to claim 12 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 37-56, 145-164, 154-173, 217-236 and/or 226-245 inclusive of Lol p 5.
14. The peptide according to claim 13 wherein said amino acids are 37-56 inclusive of Lol p 5.
15. The peptide according to claim 13 wherein said amino acids are 145-164 and/or 154-173 inclusive of Lol p 5.
16. A peptide according to claim 13 wherein said amino acids are 217-236 and/or 226-245 inclusive of Lol p 5.
17. The peptide according to claim 3 wherein said amino acid sequence comprises at least 5 amino acids derived from one or more of the following amino acid sequences:

LDKSTWYGKPTGAGPKDNG (SEQ ID NO: 5)

KPTGAGPKDNGGACGYKDVD (SEQ ID NO: 6)

FEIKCTKPESCSGEAVTVTI (SEQ ID NO: 11)

IAPYHFDLSGHAFGSMKKG (SEQ ID NO: 14)

GHAFGSMKKGEEQNVRSA (SEQ ID NO: 15)

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AGELELQFRRVKCKYPDDTK (SEQ ID NO: 17)

GSNPNYLAILVKYVDGDGDV (SEQ ID NO: 20)

KGKDKWIELKESWGAVWRID (SEQ ID NO: 23)

KESWGAVWRIDTPDKLTGPF (SEQ ID NO: 24)

18. The peptide according to claim 17 wherein said amino acid sequence is derived from one or more of SEQ ID NO:5, SEQ ID NO:15, SEQ ID NO:20 or SEQ ID NO:24.

19. The peptide according to claim 10 wherein said amino acid sequence comprises at least 5 amino acids derived from one or more of the following amino acid sequences:

DVNAGFKA AVAAAANAPPAD (SEQ ID NO: 33)

VAAAANAPPADKFKIFEAAF (SEQ ID NO: 34)

ADKFKIFEAAFSESSKGLLA (SEQ ID NO: 35)

AFSESSKGLLATSAAKAPGL (SEQ ID NO: 36)

LRVIAGALEVHAVKPATEEV (SEQ ID NO: 42)

GELQIVDKIDA AFKIAATAA (SEQ ID NO: 45)

DAAFKIAATAANAAPTNDKF (SEQ ID NO: 46)

KFTVFESAFNKALNECTGGA (SEQ ID NO: 48)

PSLEAAVKQAYAATVAAAPE (SEQ ID NO: 51)

AYAATVAAAPEVKYAVFEAA (SEQ ID NO: 52)

PEVKYAVFEAALTKAITAMT (SEQ ID NO: 53)

AALTKAITAMTQAQKAGKPA (SEQ ID NO: 54)

20. The peptide according to claim 19 wherein said amino acid sequence is derived from one or more of SEQ ID NO:33, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:53 or SEQ ID NO:54.

21. An isolated peptide comprising an amino acid sequence derived from or homologous to Lol p 1 or Lol p 5 wherein said peptide molecule is capable of interacting with T cells and modifying T cell function when incubated with cells from subjects having

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a condition characterised by an aberrant, unwanted or otherwise inappropriate immune response to Lol p 1 or Lol p 5 or a functional derivative, homologue, analogue or mutant of said peptide.

22. The peptide according to claim 21 wherein said amino acid sequence is of 5-100 residues derived from, homologous to or contiguous with amino acids 1-240 inclusive of Lol p 1.

23. The peptide according to claim 22 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 19-47, 73-92, 100-128, 127-146, 154-173 and/or 181-209 inclusive of Lol p 1.

24. The peptide according to claim 23 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 19-38, 28-47, 73-92, 100-119, 109-128, 127-146, 154-173, 181-200 and/or 190-209 inclusive of Lol p 1.

25. The peptide according to claim 24 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 19-38, 109-128, 154-173 and/or 190-209 inclusive of Lol p 1.

26. The peptide according to claim 25 wherein said amino acids are 19-38 inclusive of Lol p 1.

27. The peptide according to claim 25 wherein said amino acids are 109-128 and/or 154-173 inclusive of Lol p 1.

28. The peptide according to claim 25 wherein said amino acids are 190-209 inclusive of Lol p 1.

29. The peptide according to claim 25 wherein said amino acid sequence comprises at least 5 amino acids derived from one or more of the following amino acid sequences:

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LDKSTWYGKPTGAGPKDNG (SEQ ID NO: 5)  
KPTGAGPKDNGGACGYKDVD (SEQ ID NO: 6)  
FEIKCTKPESCSGEAVTVTI (SEQ ID NO: 11)  
IAPYHFDLSGHAFGSMKKG (SEQ ID NO: 14)  
GHAFGSMKKGEEQNVRISAG (SEQ ID NO: 15)  
AGELELQFRRVKCKYPDDTK (SEQ ID NO: 17)  
GSPNPYLAILVKYVDGDGDV (SEQ ID NO: 20)  
KGKDKWIELKESWGAVWRID (SEQ ID NO: 23)  
KESWGAVWRIDTPDKLTGPF (SEQ ID NO: 24)

30. The peptide according to claim 29 wherein said amino acid sequence is derived from one or more of SEQ ID NO: 5 or SEQ ID NO:15, SEQ ID NO:20 or SEQ ID NO:24.

31. The peptide according to claim 21 wherein said amino acid sequence is of 5-100 residues derived from, homologous to or contiguous with amino acids 1-276 inclusive of Lol p 5 provided that said peptide does not consist of the amino acid sequence 100-110 or 190-209.

32. The peptide according to claim 31 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 37-83, 118-137, 145-173, 172-191 or 190-245 inclusive of Lol p 5.

33. The peptide according to claim 32 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 37-56, 46-65, 55-74, 64-83, 118-137, 145-164, 154-173, 172-191, 199-218, 208-227, 217-236 and/or 226-245 inclusive of Lol. p 5.

34. The peptide according to claim 33 wherein said amino acid sequence is derived from, homologous to or contiguous with amino acids 37-56, 145-164, 154-173, 217-236 and/or 226-245 inclusive of Lol p 5.

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35. The peptide according to claim 34 wherein said amino acids are 37-56 inclusive of Lol p 5.

36. The peptide according to claim 34 wherein said amino acids are 145-164 and/or 154-173 inclusive of Lol p 5.

37. The peptide according to claim 34 wherein said amino acids are 217-236 and/or 226-245 inclusive of Lol p 5.

38. The peptide according to claim 34 wherein said amino acid sequence comprises at least 5 amino acids derived from one or more of the following amino acid sequences:

DVNAGFKAAVAAAANAPPAD (SEQ ID NO: 33)

VAAAANAPPADKFKIFEAAF (SEQ ID NO: 34)

ADKFKIFEAAFSESSKGLLA (SEQ ID NO: 35)

AFSESSKGLLATSAAKAPGL (SEQ ID NO: 36)

LRVIAGALEVHAVKPATEEV (SEQ ID NO: 42)

GELQIVDKIDAAFKIAATAA (SEQ ID NO: 45)

DAAFKIAATAANAAPTNDKF (SEQ ID NO: 46)

KFTVFESAFNKALNECTGGA (SEQ ID NO: 48)

PSLEAAVKQAYAATVAAAPE (SEQ ID NO: 51)

AYAATVAAAPEVKYAVFEAA (SEQ ID NO: 52)

PEVKYAVFEAAALTKAITAMT (SEQ ID NO: 53)

AALTKAITAMTQAQKAGKPA (SEQ ID NO: 54)

39. The peptide according to claim 38 wherein said amino acid sequence is derived from one or more of SEQ ID NO:33, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:53 or SEQ ID NO:54.

40. An isolated nucleic acid molecule comprising a sequence of nucleotide encoding or complementary to a sequence encoding a peptide according to any one of claims 1-39.
41. A method for the treatment and/or prophylaxis of a condition in a subject, which condition is characterised by an aberrant, unwanted or otherwise inappropriate immune response to Lol p 1 and/or Lol p 5, said method comprising administering to said subject an effective amount of a peptide according to any one of claims 1-39 for a time and under conditions sufficient to remove or reduce the presence or function in said subject of T cells directed to said Lol p 1 and/or Lol p 5.
42. The method according to claim 41 wherein said condition is hypersensitivity to a grass pollen of the subfamily Pooideae and even more preferably Rye grass or Timothy grass pollen.
43. Use of a peptide according to any one of claims 1-39 in the manufacture of a medicament for the treatment of a condition in a mammal which condition is characterised by an aberrant, unwanted or otherwise inappropriate immune response to Lol p 1 and/or Lol p 5.
44. Use according to claim 43 wherein said condition is hypersensitivity to a grass pollen of the subfamily Pooideae and even more preferably Rye grass or Timothy grass pollen.
45. A pharmaceutical composition comprising a peptide according to any one of claims 1-39 together with one or more pharmaceutically acceptable carriers and/or diluents.
46. A method of diagnosing or monitoring a condition in a mammal, which condition is characterised by an aberrant, unwanted or inappropriate response to Lol p 1 and/or Lol p 5, said method comprising screening for Lol p 1 and/or Lol p 5 reactive T cells and/or antibodies utilising the peptides according to any one of claims 1-39.



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46. The method according to claim 45 wherein said condition is hypersensitivity to a grass pollen of the subfamily Pooideae and even more preferably Rye grass or Timothy grass pollen.

47. A diagnostic kit for use in the method of any one of claims 41-46 wherein said kit comprises a peptide according to any one of claims 1-39.